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EXAMINER	
SELLERS, DANIEL R	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/935,349	WEARE, CHRISTOPHER B.	
	Examiner	Art Unit	
	Daniel R. Sellers	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 July 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13,15,17,21-26 and 30-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13,15,17,21-26 and 30-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 August 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. Regarding **claim 33**, the claimed subject matter is "a classification chain data structure... comprising". Data is not covered by the statutory categories and is not protected by judicial exemptions. Therefore, a data structure is non-statutory matter.

Claim Rejections - 35 USC § 102

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. **Claims 30-33** are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Gjerdingen.

4. Regarding **claim 30**, see Gjerdingen

A computing system, comprising:
a computing device including:
a classification chain data structure stored thereon having a plurality of classification vectors, wherein each vector includes data representative of a spectral properties class as classified by humans and spectral properties characteristics as determined by digital signal processing; and (Col. 3, lines 23-61 and Col. 9, lines 28-39)
processing means for comparing an unclassified media entity to the classification chain data structure to determine an estimate of the spectral properties class of the unclassified media entity. (Col. 6, line 38 – Col. 7, line 2)

Gjerdingen teaches a computing system with these features to create a searchable database. Gjerdingen teaches either human or machine classification (Fig. 4, items, 401, 403 and 403B and col. 6, lines 38-64).

5. Regarding **claim 31**, the further limitation of claim 30, see Gjerdingen

... wherein said determining of an estimate of the spectral properties class includes returning at least one number indicating the level of confidence of the spectral properties class assignment. (Col. 10, lines 53-57)

Gjerdingen teaches a level of confidence indicator.

6. Regarding **claim 32**, the further limitation of claim 31, see the preceding argument with respect to claims 30 and 31. It is inherent that a system using the method taught by Gjerdingen will undergo an improvement in classification with experts review and more data samples (Col. 8, lines 19-24).

7. Regarding **claim 33**, see the preceding argument with respect to claim 30. Gjerdingen teaches a system with human and DSP classification techniques regarding the spectral properties of media entities.

Claim Rejections - 35 USC § 103

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

9. **Claims 1-13, and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Blum and Kjaer, U.S. Pat. No. 4,603,386.

10. Regarding **claim 1**, see Blum

A method for automatically classifying spectral properties of audio data, comprising:
applying input audio data (1) to a critical band filtering process to form first output data and (2) to an entropy calculation process to form second output data; (Col. 6, lines 24-28)
applying the first output data to a first derivative process to form third output data; (Col. 6, lines 28-30) *and*
inputting said first, second and third output data to an averaging process to form a spectral feature vector representing the input audio data. (Col. 6, lines 32-35 and lines 45-48)

Blum teaches a method for automatically classifying spectral properties of audio data, wherein a feature vector is created with the above features. The critical band filtering process, as taught by Blum, is a Mel-frequency cepstral coefficient process. Blum does

not teach the entropy calculation for use in a feature vector, however Blum has described a feature vector with a plurality of metrics. Kjaer teaches an entropy calculation, wherein a musical tone is classified by notes and accidentals (see Abstract and Col. 4, line 55 – Col. 7, line 34). Kjaer teaches that entropy is useful in classifying information composed of random processes, or processes that can be better understood using probability theory. It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teachings of Blum and Kjaer for the purpose of better classification.

11. Regarding **claim 2**, the further limitation of claim 1, see Blum

... wherein the audio data is divided into frames, and the method is performed frame by frame. (Col. 6, lines 56-58)

In the combination, Blum teaches the division of audio data into frames, wherein the method is performed frame by frame.

12. Regarding **claim 3**, the further limitation of claim 1, see

... further including calculating root mean squared values of the input audio data. (Col. 8, lines 1-3)

In the combination, Blum teaches RMS values.

13. Regarding **claim 4**, the further limitation of claim 2, see Kjaer

... wherein said entropy calculation process includes calculating:

$$S = - \sum_w p_w \log_2(p_w)$$

where S is the entropy of the frame, p_w is the normalized magnitude of a bin w of the audio data, and $\log_2(p_w)$ is the log base 2 of (p_w). (Col. 5, lines 5-12 and equation H(x))

Kjaer teaches this entropy measure.

14. Regarding **claim 5**, the further limitation of claim 2, see the preceding argument with respect to claim 3. Blum teaches the square root of the sum of squares, where the square root is a mapping function and adjusts the scale of the function.

15. Regarding **claim 6**, the further limitation of claim 2, see the preceding argument with respect to claim 1. The combination teaches this feature.

16. Regarding **claim 7**, the further limitation of claim 1, see the preceding argument with respect to claim 1. The combination teaches a frequency domain transform.

17. Regarding **claim 8**, the further limitation of claim 7, see Blum

... wherein said converting of the input audio data signal from the time domain to the frequency domain includes performing a fast fourier transform on the audio data. (Col. 7, lines 56-61)

In the combination, Blum teaches an FFT.

18. Regarding **claim 9**, the further limitation of claim 2, see the preceding argument with respect to claim 1. The combination teaches dividing the input signal into frames and averaging the features over all the frames.

19. Regarding **claim 10**, the further limitation of claim 1, see the preceding argument with respect to claim 1. The combination teaches a classification process using the feature vector, and this classification process determines a property class that describes the audio data (Col. 6, lines 7-10).

20. Regarding **claim 11**, the further limitation of claim 1, see the preceding argument with respect to claim 1. In the combination, Blum teaches a feature vector, and Blum teaches that a vector is a row vector and not an NxM array (Col. 5, lines 52-55). Blum teaches a 1xN array, wherein it is inherent that N can be 25.

21. Regarding **claim 12**, the further limitation of claim 1, see Blum

... wherein the audio data is formatted according to pulse code modulated format. (Col. 5, lines 24-50 and lines 64-66)

In the combination, Blum teaches a plurality of input devices in the system, wherein it is well known that optical disks containing audio data are encoded in a PCM format. Inherently Blum teaches this feature.

22. Regarding **claim 13**, the further limitation of claim 12, see the preceding argument with respect to claim 12. In the combination, Blum teaches the use of a microphone and further teaches that a sound produced into the microphone can be searched (Col. 3, lines 52-55). It is inherent that the digitization step converts the analog waveform to a PCM format.

23. Regarding **claim 15**, the further limitation of claim 12, see the preceding argument with respect to claim 8. The combination teaches an FFT operation, which is performed on the audio data.

24. **Claim 17** is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Blum and Kjaer as applied to claim 1 above, and further in view of Gjerdingen.

25. Regarding **claim 17**, the further limitation of claim 1, see Gjerdingen

... further comprising performing a principal component analysis process on the spectral feature vector. (Col. 15, lines 37-44)

Blum teaches a refining process on the feature vector, but does not teach principal component analysis (PCA). Gjerdingen teaches that PCA is used to reduce the complexity of the data being analyzed. It would have been obvious for one of ordinary

skill in the art at the time of the invention to combine the teachings of Blum, Kjaer, and Gjerdingen for the purpose of reducing the complexity of the analysis.

26. **Claims 21-26, 34, and 35** are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Blum and Gjerdingen.

27. Regarding **claim 21**, see Blum

A method of classifying data according to spectral properties of the data, comprising:
assigning at least one spectral properties class to each media entity of a plurality of media entities in a data set wherein said assigning is not based on digital signal processing; (Col. 21, lines 55-58, line 64 – Col. 22, line 3 and Col. 22, lines 31-33)
processing each media entity of said data set to extract at least one spectral properties characteristic based on digital signal processing of each media entity; (Col. 22, lines 45-48)
generating a plurality of spectral properties vectors for said plurality of media entities, wherein each spectral properties vector includes said at least one spectral properties class and at least one spectral properties characteristic based on digital signal processing; and (Col. 22, lines 48-50)
forming a classification chain based upon said plurality of spectral properties vectors and the at least one spectral properties class. (Col. 22, lines 55-65)

Blum teaches a method equivalent of classifying data according to its spectral properties and class with these features. However, Blum teaches a disjointed approach, wherein the spectral properties class assigning that is not based on digital signal processing and the extraction of the spectral properties characteristic based on digital signal processing are not taught to be performed together in classifying (i.e. Blum teaches the use of DSP when the non-DSP classification method fails and does not positively say they are used together to classify signals).

Gjerdingen teaches the use of DSP and non-DSP classification methods together to model, or classify, the signals (Col. 6, lines 38-64 and Fig. 4, units 401, 403A, 403B, and 404-406). It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teachings of Blum and Gjerdingen for the purpose of

placing music under many searchable elements (i.e. searching by artist, mood, genre, sub-genre, etc...) (Gjerdingen, Col. 3, lines 23-67, Col. 8, lines 34-40, and lines 50-57).

28. Regarding **claim 22**, the further limitation of claim 21, see

... further comprising:
processing an unclassified media entity to extract at least one spectral properties characteristic based on digital signal processing of the unclassified media entity; (Col. 21, lines 55-58)
generating a vector for the unclassified media entity including said at least one digital signal processing spectral properties characteristic; (Col. 21, lines 58-60)
presenting the vector for the unclassified media entity to the classification chain; and
classifying the unclassified entry with an estimate of the spectral properties class by calculating the representative spectral properties class of the subset of the plurality of vectors of the classification chain located in the neighborhood of the vector for the unclassified entity. (Col. 21, line 66 – Col. 22, line 3)

Blum teaches these features in a method of classifying data.

29. Regarding **claim 23**, the further limitation of claim 22, see Blum

... further including calculating a neighborhood distance that defines a distance within which two vectors in the classification chain space are in the same neighborhood for purposes of being in the same spectral properties class. (Col. 22, lines 3-20)

Blum teaches a calculation of a neighborhood distance.

30. Regarding **claim 24**, the further limitation of claim 22, see the preceding argument with respect to claim 23. Blum teaches classifying the entries according to statistical properties of the spectral properties of an entry, such as standard deviations or range values (Col. 21, lines 61-63). It is inherent to use the median to describe skewed sample ranges (Col. 22, lines 21-26).

31. Regarding **claim 25**, the further limitation of claim 22, see the preceding argument with respect to claim 23. Blum teaches a method of describing an unclassified entry according to a numerical value with these features.

32. Regarding **claim 26**, the further limitation of claim 22, see the preceding argument with respect to claim 31. Blum teaches the features of the parent claims 21 and 22, but Blum does not teach a level of confidence measure. Gjerdingen teaches a measure indicating the level of confidence regarding classification.

33. Regarding **claim 34**, Gjerdingen teaches human classification of the audio data (Fig 5a), wherein each entry is assigned at least one value. Blum teaches that the construction phase reduces the results to a set of numbers called the characteristic vector, wherein the vector is stored for later use (Col. 3, lines 10-21 and lines 30-34). Blum also teaches a classification phase comprising presenting an unclassified sound and calculating the characteristic vector (Col. 6, lines 24-30), and presenting the vector to the classification chain, which returns an estimate (Col. 6, lines 45-52).

34. Regarding **claim 35**, the further limitation of claim 34, see the preceding argument with respect to claims 1-5 and 34. The combination of Blum and Gjerdingen teach these features in a method of classifying data.

Response to Arguments

35. Applicant's arguments, see p. 8, filed 4/11/07, with respect to claims 1-13, 15, 17-30, and 34 have been fully considered and are persuasive. The rejection under 35 USC 101 of claims 1-13, 15, 17, 21-26, and 30-35 has been withdrawn. The rejection of **claim 33** under 35 USC 101 remains.

36. Applicant's arguments, see pp. 9-10, filed 4/11/07, with respect to the rejections under 35 USC 102 and 103 have been fully considered but they are not persuasive.

37. Regarding **claims 30-33**, the examiner respectfully disagrees. Gjerdingen teaches spectral properties class(es) as classified by humans (Col. 3, lines 23-61), wherein listener's and expert's responses are used in the broadest sense to classify according to spectral properties (i.e. indicating the music is intense, the music is good for a workout, the singer has a powerful voice, the music has a good groove, the music belongs to a certain genre, the music is instrumental, and the music includes acoustic guitar). All of these, together or in isolation, can classify the spectral properties to some extent.

38. Regarding **claims 1-13, and 15**, the examiner respectfully disagrees. The Mel scale is a perceptual scale of pitches, and therefore the use of MFCC's reads on the limitation of "a critical band filtering process that filters the audio data proximate a human auditory frequency range".

Mauuary et al., USPN 6,157,909 (previously introduced), is used as evidence to this statement. Mauuary et al. teaches the use of non-linear perceptual scales, which are either the Mel scale or the Bark scale. Mauuary et al. further teaches the MFCC calculation process using the Mel scale (Col. 2, lines 9-29 and Fig. 1b).

Slaney, USPN 5,749,073, is used as evidence to the above statement. Slaney teaches that "the MFCC for a sound is computed by resampling the magnitude spectrum to match critical bands that are related to auditory perception." (Col. 6, lines 10-13).

Pi et al., US PGPub 2004/0015357, is used as evidence to the above statement. Pi et al. also teaches that "Mel-frequency cepstral coefficients approximate the critical

band of the human auditory system by warping the frequency access prior to linear transform." (¶ 0012).

39. Regarding **claims 17**, see the preceding argument with respect to claims 1. The combination of Blum, Kjaer, and Gjerdingen teaches these features.

40. Regarding **claims 21- 26, 34, and 35**, see the preceding argument with respect to claims 30-33. The examiner maintains that the combination of Blum and Gjerdingen teaches these features.

Conclusion

41. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Slaney, USPN 5,749,073 - is used as evidence that gathering MFCC's are synonymous with critical band filtering;

Pi et al., US PGPub 2004/0015357 - is used as evidence that gathering MFCC's are synonymous with critical band filtering;

Mauuary et al., USPN 6,157,909 (previously introduced) - is used as evidence that gathering MFCC's are synonymous with critical band filtering;

Glaser et al., USPN 7,003,515 (previously introduced) - teaches classification using vectors (see Brief Summary, col. 1-2);

Logan et al., USPN 7,031,980 (previously introduced) - teaches different spectral representations of the input signal and MFCCs (see Detailed Description, col. 5-6); and

Forbes.com "MongoMusic Fans Include Microsoft" (previously introduced) - teaches expert classification and DSP classification

42. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel R. Sellers whose telephone number is 571-272-7528. The examiner can normally be reached on Monday to Friday, 9am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571)272-7564. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SINH TRAN
SUPERVISORY PATENT EXAMINER

DRS